FIG. 1

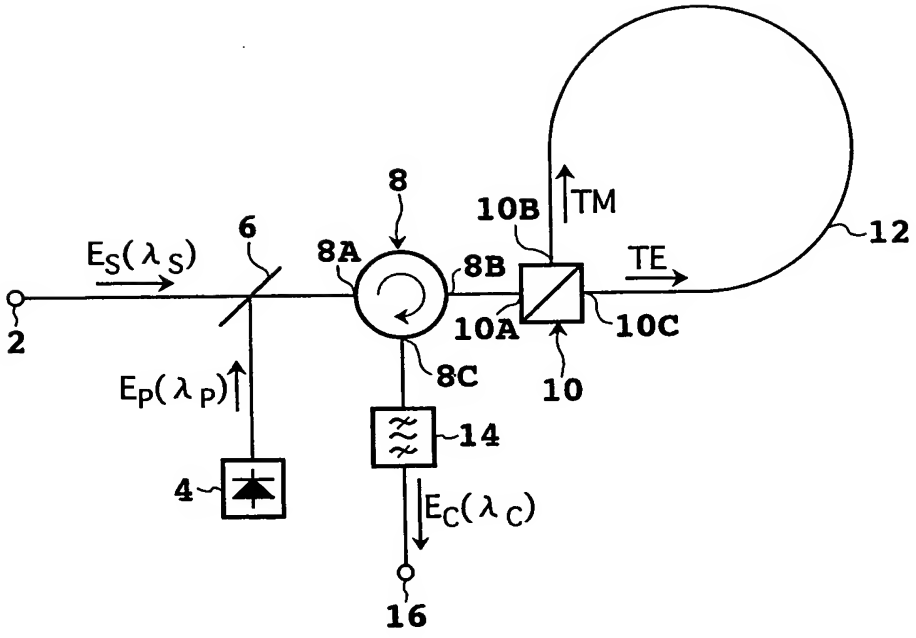

8
10B
TM
12
6
$E_S(\lambda_S)$
8A
8B
TE
2
10A
10C
8C
10
$E_P(\lambda_P)$
14
4
$E_C(\lambda_C)$
16

FIG. 2

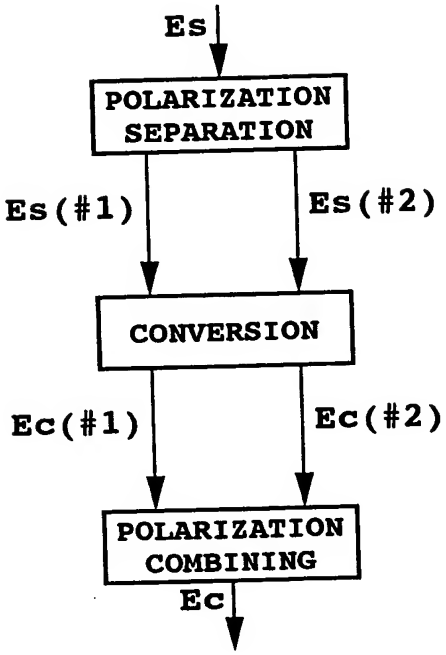

Es
POLARIZATION SEPARATION
Es(#1)
Es(#2)
CONVERSION
Ec(#1)
Ec(#2)
POLARIZATION COMBINING
Ec

FIG. 3

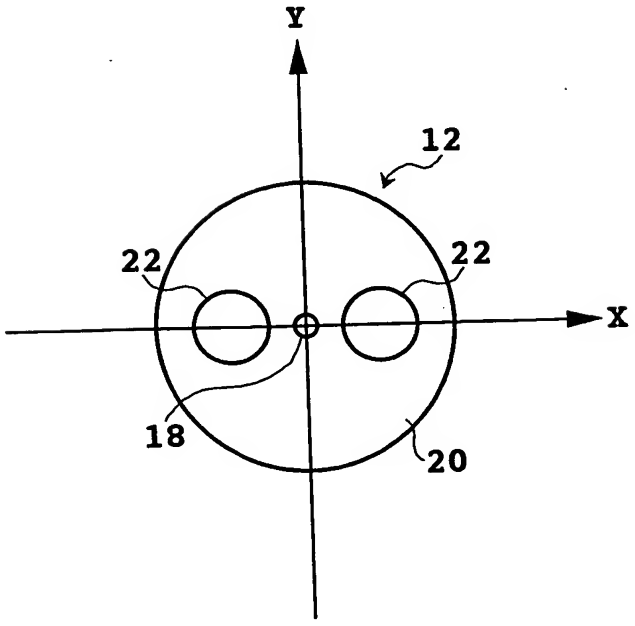

Y
12
22
22
X
18
20

FIG. 4

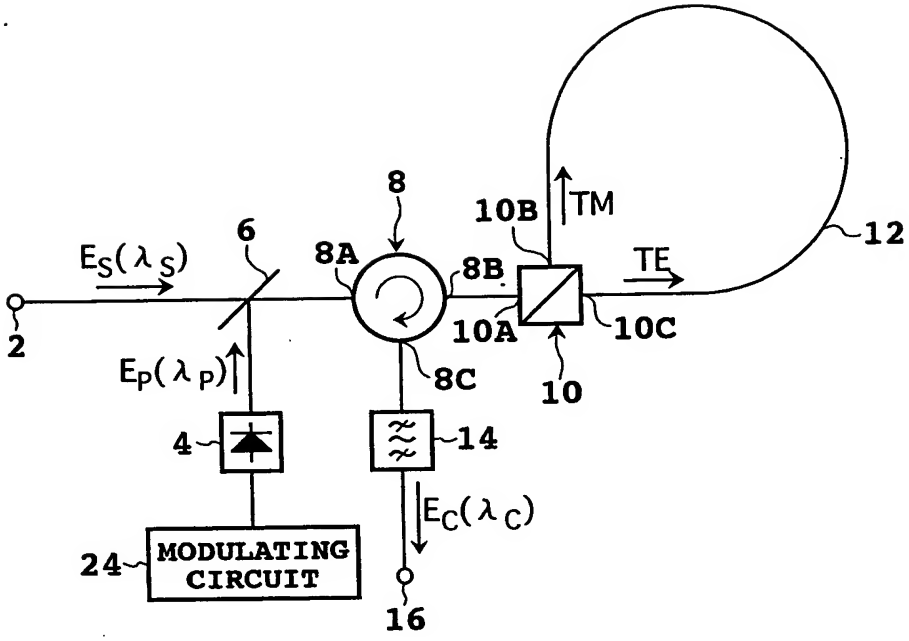

8
10B
TM
12
6
8A
8B
TE
$E_S(\lambda_S)$
2
10A
10C
$E_P(\lambda_P)$
8C
10
4
14
$E_C(\lambda_C)$
24
MODULATING CIRCUIT
16

FIG. 5

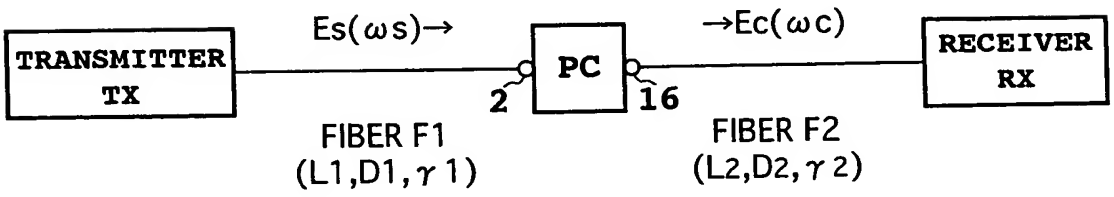

TRANSMITTER TX
Es(ωs)→
PC
→Ec(ωc)
RECEIVER RX
2
16
FIBER F1
(L1,D1,γ1)
FIBER F2
(L2,D2,γ2)

FIG. 6

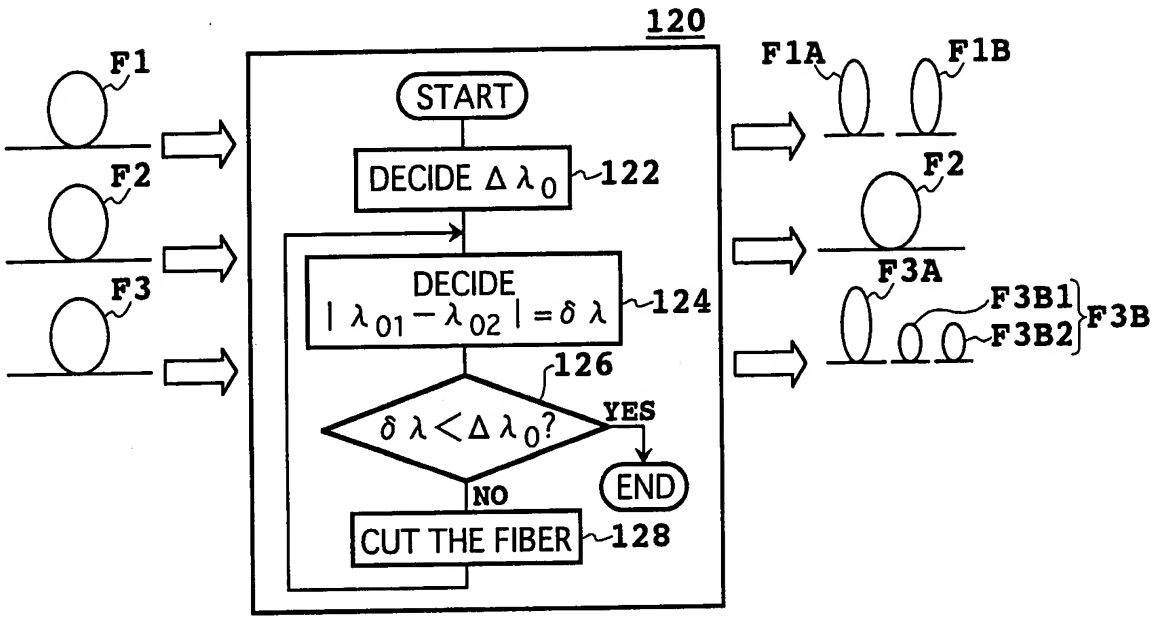

120
F1
F2
F3
START
DECIDE Δλ0
122
DECIDE
|λ01−λ02|=δλ
124
126
δλ<Δλ0?
YES
NO
END
CUT THE FIBER
128
F1A
F1B
F2
F3A
F3B1
F3B2
F3B

FIG. 7

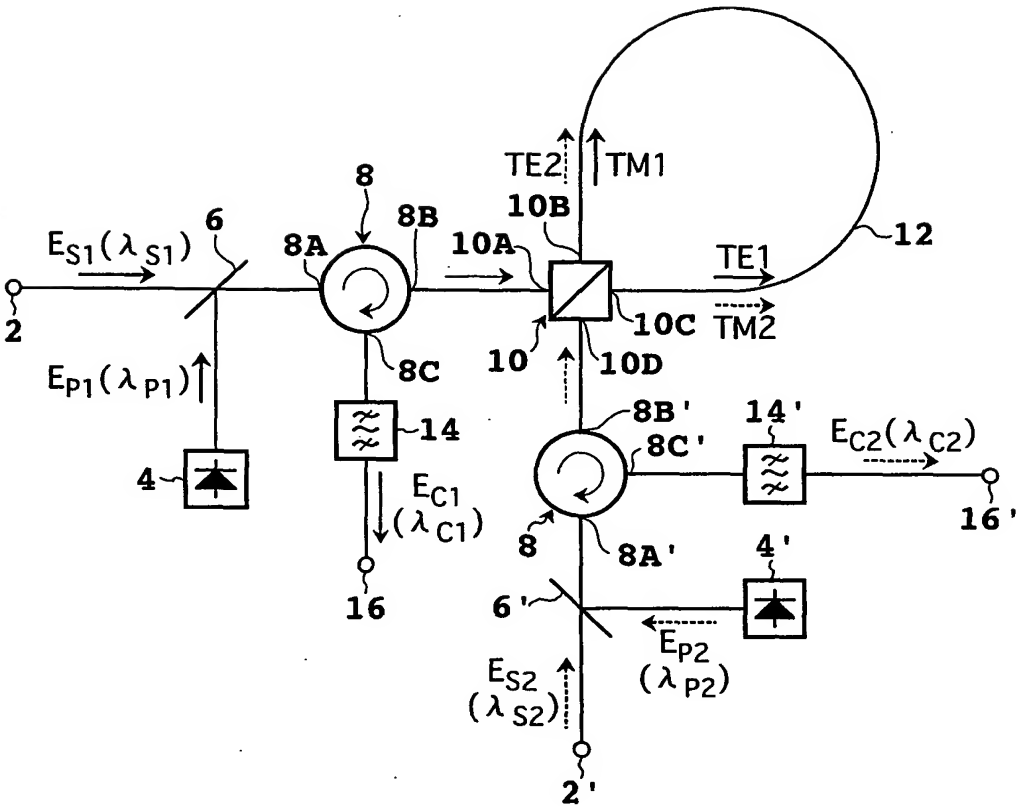
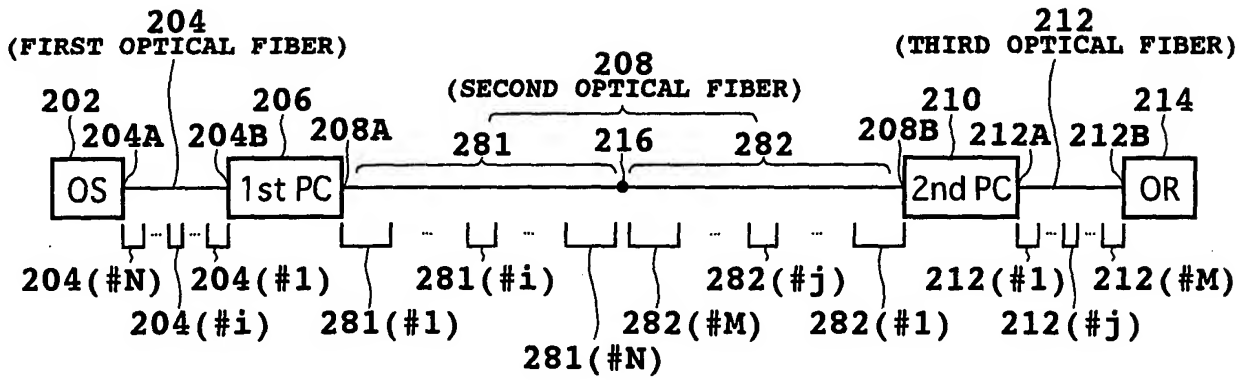

8
TE2
TM1
10B
6
8B
12
$E_{S1}(\lambda_{S1})$
8A
10A
TE1
2
10C
TM2
10
10D
$E_{P1}(\lambda_{P1})$
8C
8B'
14'
14
$E_{C2}(\lambda_{C2})$
8C'
4
E_{C1}
(λ_{C1})
16'
8
8A'
4'
16
6'
E_{P2}
(λ_{P2})
E_{S2}
(λ_{S2})
2'

FIG. 8


204
(FIRST OPTICAL FIBER)
208
(SECOND OPTICAL FIBER)
212
(THIRD OPTICAL FIBER)
202
204A
204B
206
208A
281
216
282
208B
210
212A
212B
214
OS
1st PC
2nd PC
OR
204(#N)
204(#1)
281(#i)
282(#j)
212(#1)
212(#M)
204(#i)
281(#1)
282(#M)
282(#1)
212(#j)
281(#N)

F I G. 9

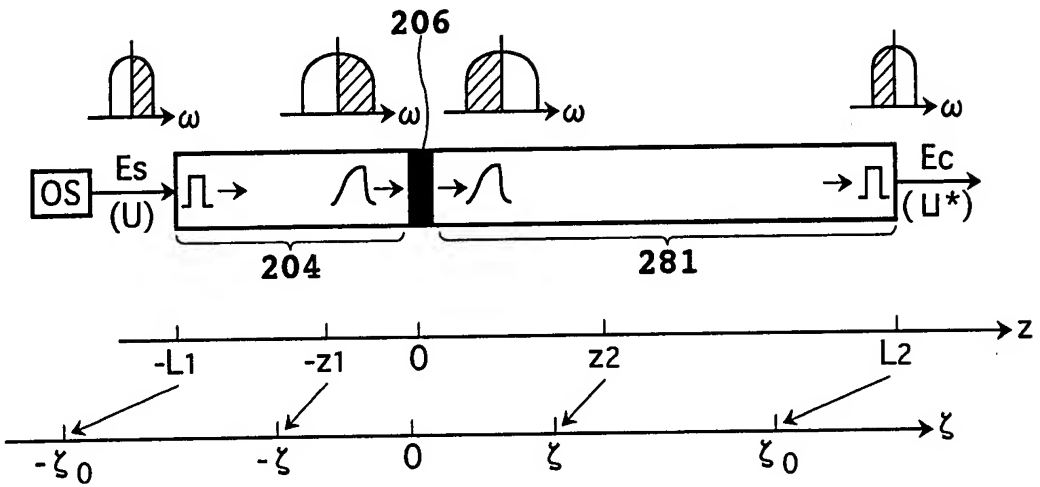


FIG. 10

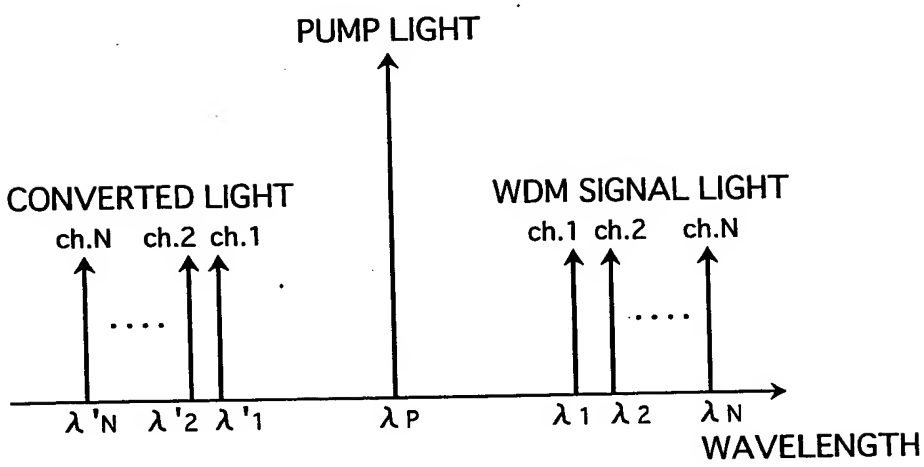

PUMP LIGHT
CONVERTED LIGHT
ch.N ch.2 ch.1
WDM SIGNAL LIGHT
ch.1 ch.2 ch.N
λ'N λ'2 λ'1
λP
λ1 λ2 λN
WAVELENGTH

FIG. 11

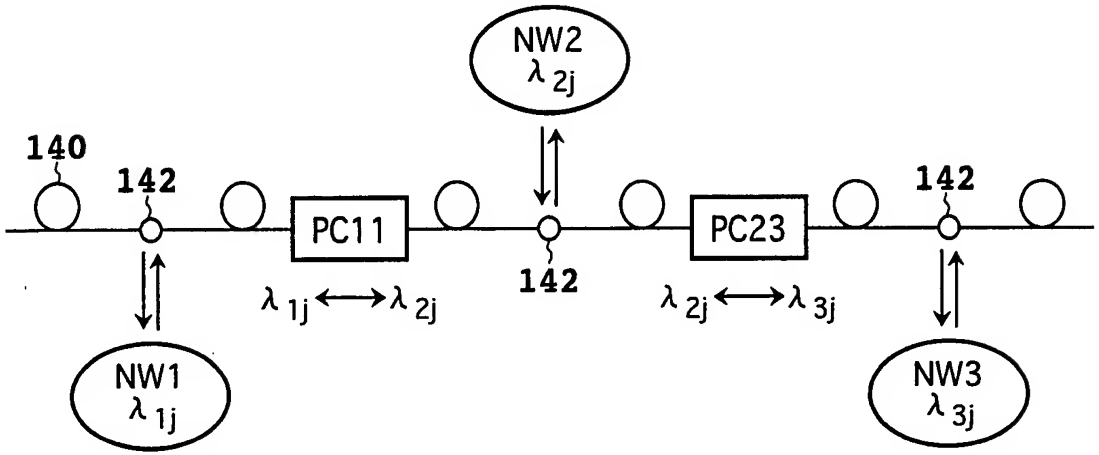

NW2
λ 2j
140
142
142
PC11
PC23
142
λ 1j ⟷ λ 2j
λ 2j ⟷ λ 3j
NW1
λ 1j
NW3
λ 3j

FIG. 12

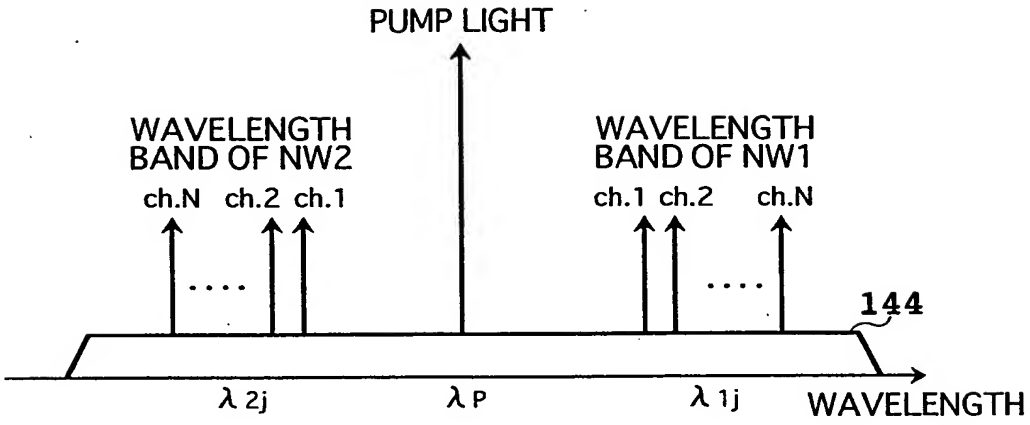

PUMP LIGHT
WAVELENGTH BAND OF NW2
ch.N ch.2 ch.1
WAVELENGTH BAND OF NW1
ch.1 ch.2 ch.N
144
λ2j
λP
λ1j
WAVELENGTH

FIG. 13

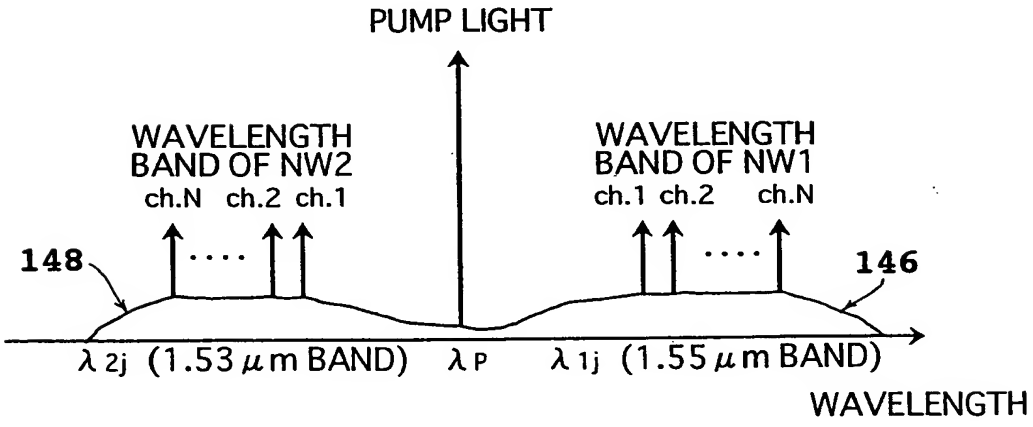

PUMP LIGHT
WAVELENGTH BAND OF NW2
ch.N ch.2 ch.1
WAVELENGTH BAND OF NW1
ch.1 ch.2 ch.N
148
146
λ2j (1.53μm BAND)
λP
λ1j (1.55μm BAND)
WAVELENGTH

FIG. 14

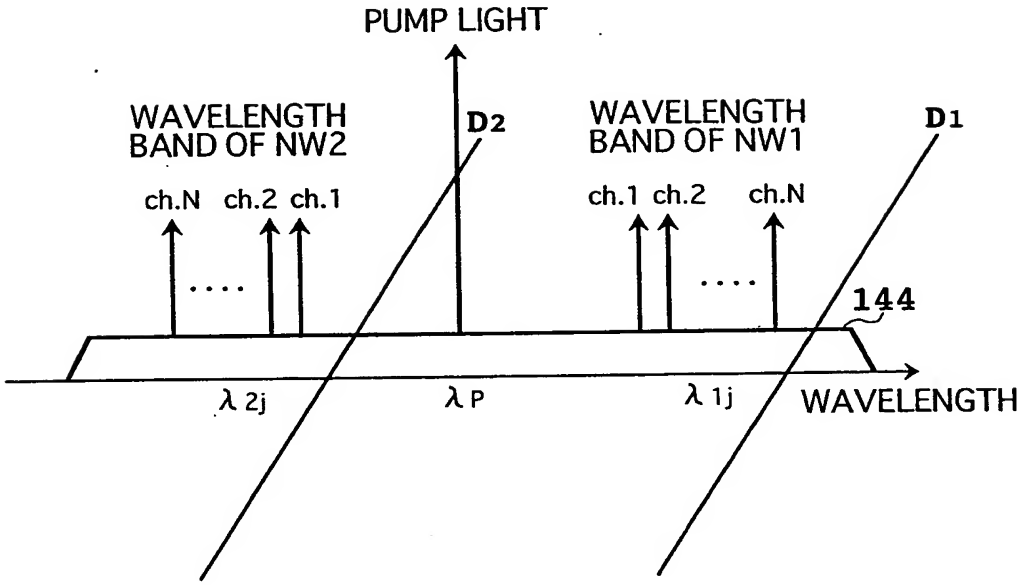

PUMP LIGHT
WAVELENGTH BAND OF NW2
ch.N ch.2 ch.1
D2
WAVELENGTH BAND OF NW1
ch.1 ch.2 ch.N
D1
144
λ 2j
λ P
λ 1j
WAVELENGTH

FIG. 15

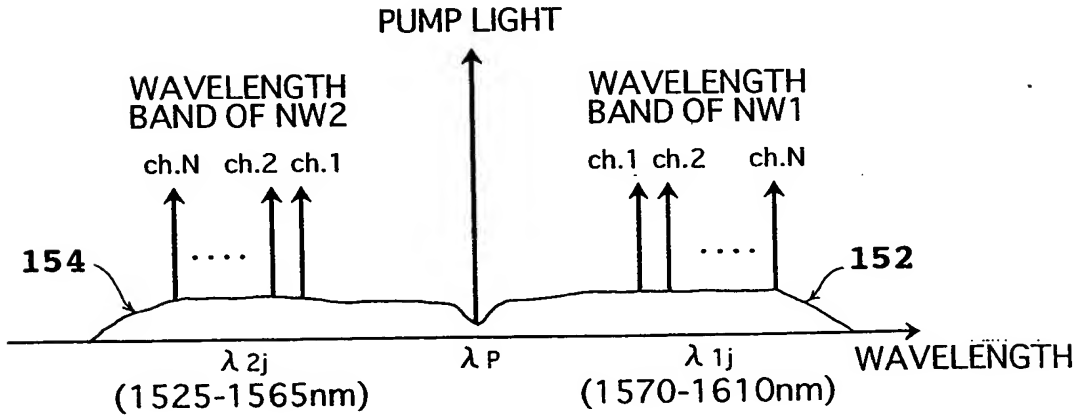

PUMP LIGHT
WAVELENGTH BAND OF NW2
ch.N ch.2 ch.1
WAVELENGTH BAND OF NW1
ch.1 ch.2 ch.N
154
152
λ 2j
(1525-1565nm)
λ P
λ 1j
(1570-1610nm)
WAVELENGTH

FIG. 16

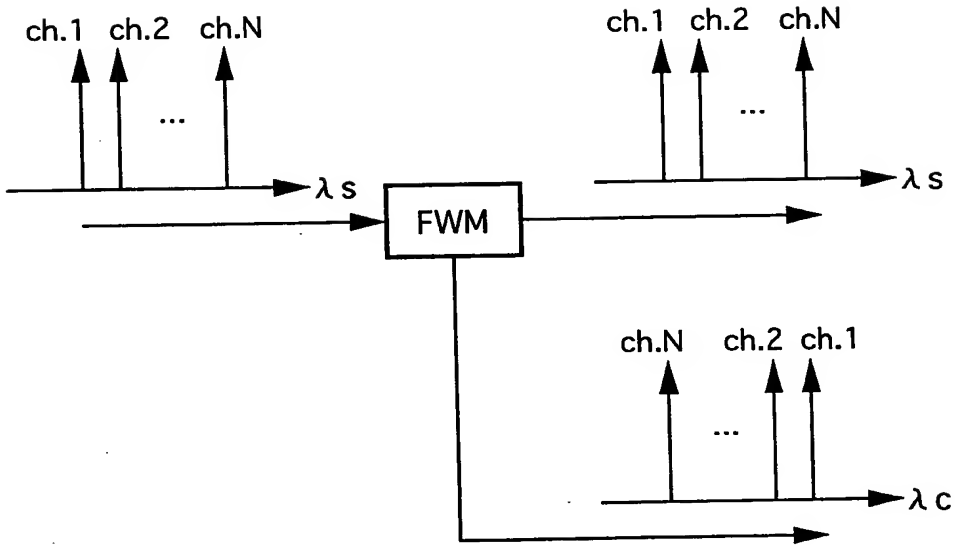


FIG. 17

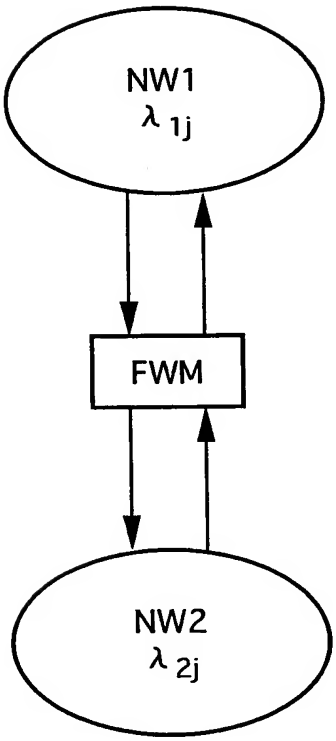


FIG. 18

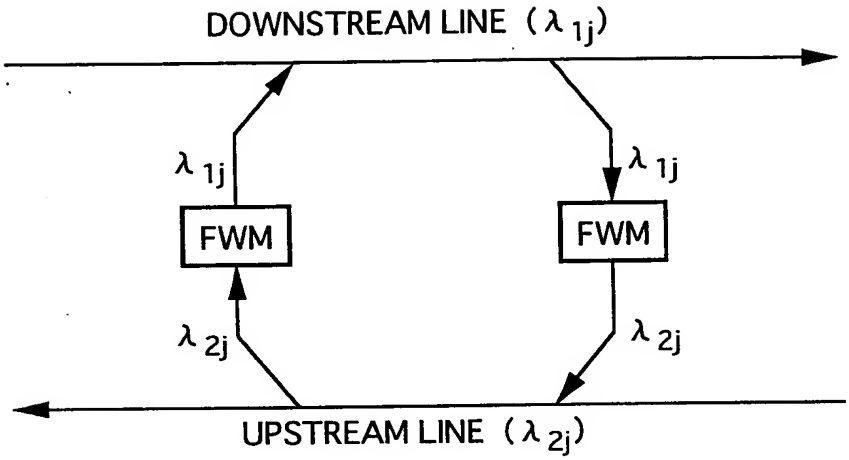

DOWNSTREAM LINE (λ 1j)
λ 1j
λ 1j
FWM
FWM
λ 2j
λ 2j
UPSTREAM LINE (λ 2j)

FIG. 19

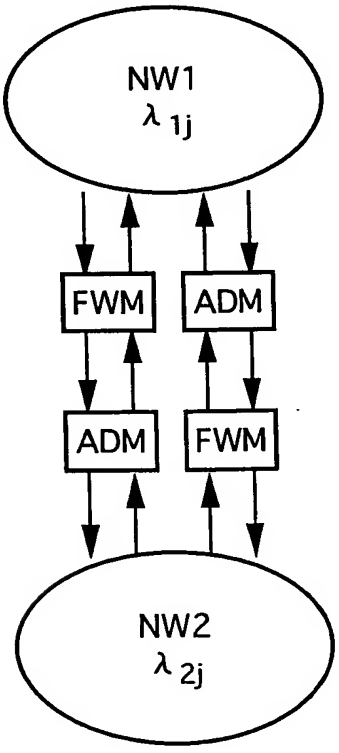

NW1
λ 1j
FWM
ADM
ADM
FWM
NW2
λ 2j

FIG. 20

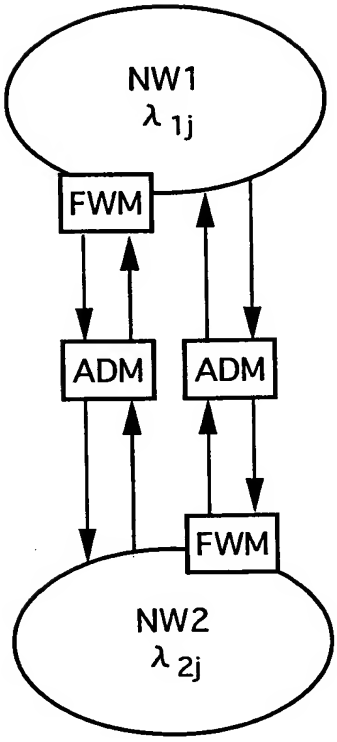


FIG. 21

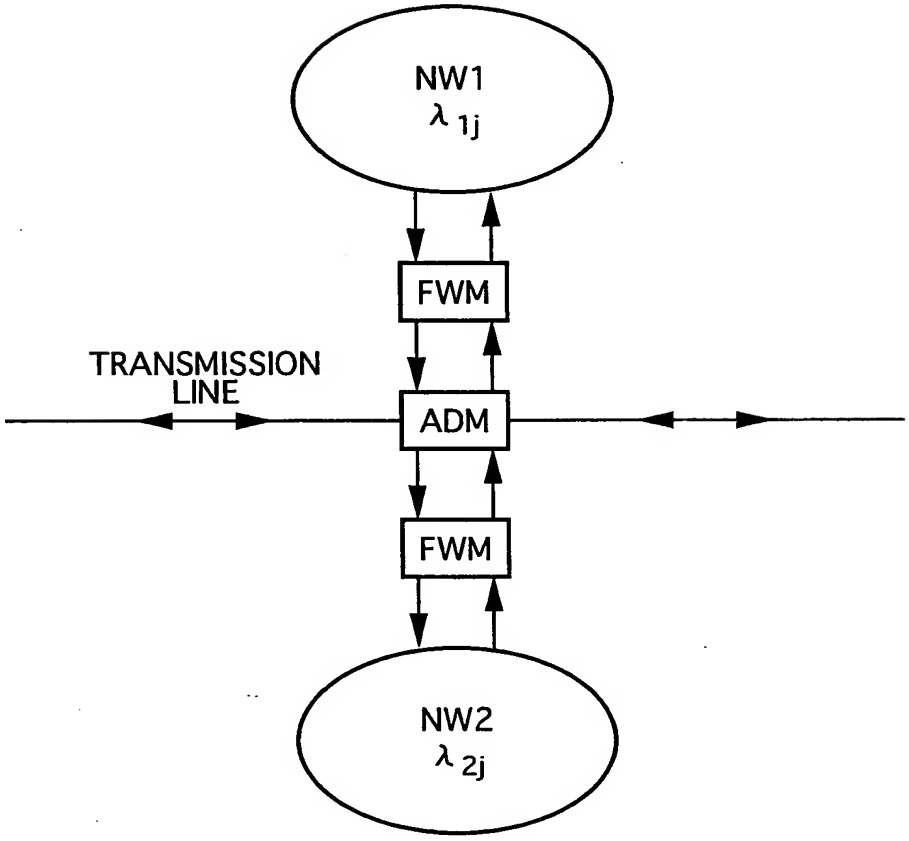


FIG. 22

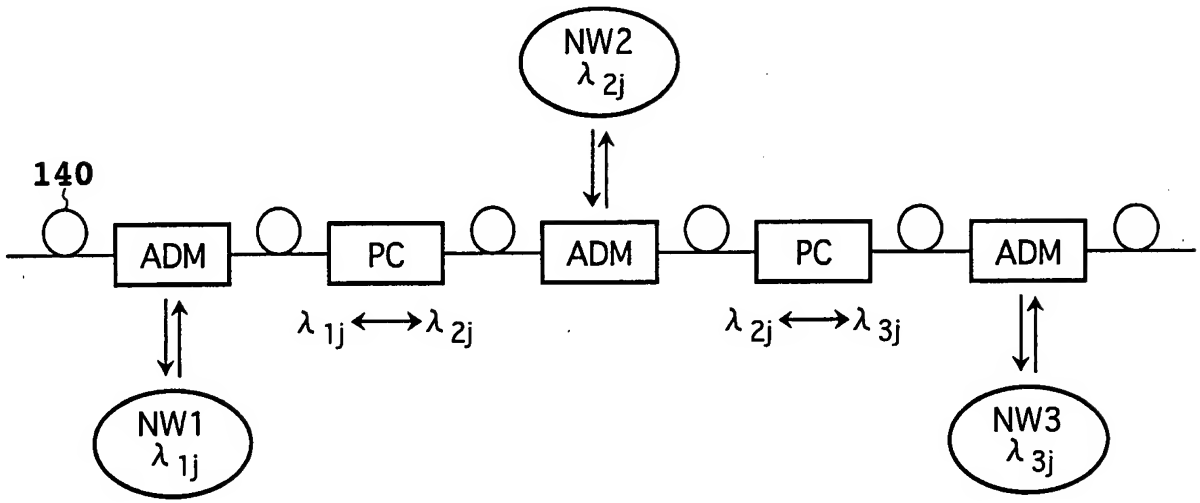
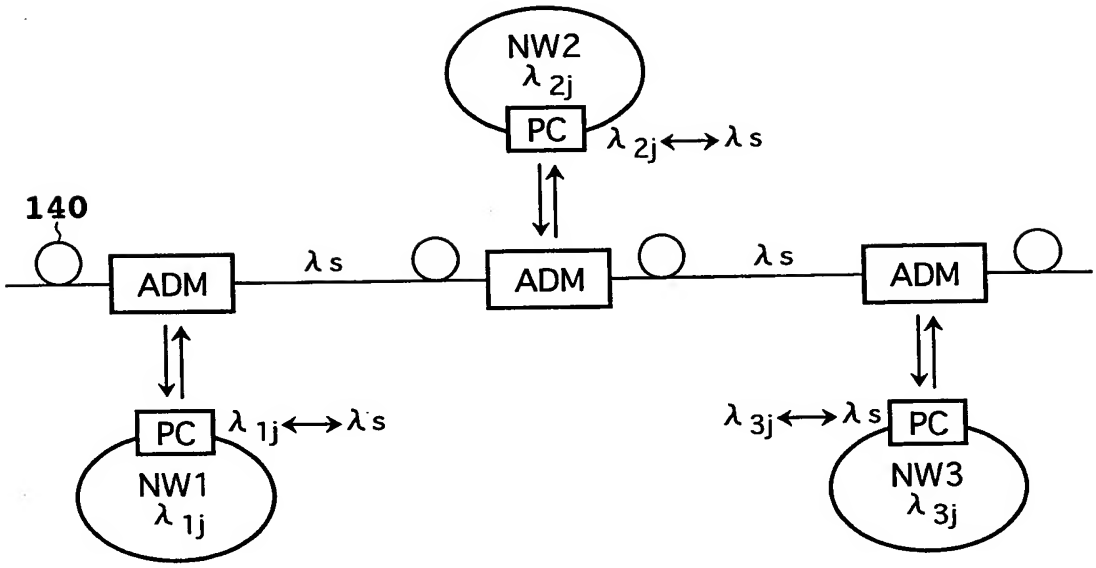


FIG. 23


NW2
λ 2j
PC
λ 2j ⟷ λ s
140
ADM
λ s
ADM
λ s
ADM
PC
λ 1j ⟷ λ s
NW1
λ 1j
λ 3j ⟷ λ s
PC
NW3
λ 3j